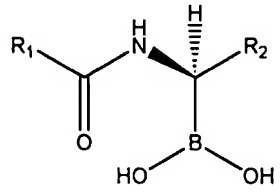
We Claim:

1. A β-lactamase inhibitor compound having a formula



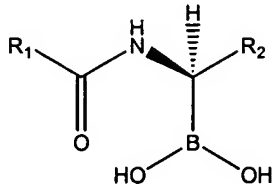
wherein R_1 is a substituent selected from hydrogen, alkyl, alkenyl, cycloalkenyl, and heterocyclyl moieties; and wherein R_2 is a substituent selected from heterocyclyl, cycloalkeny, alkenyl and alkyl moieties.

2. A β-lactamase inhibitor compound of Claim 1 wherein said R_1 substituent further comprises at least one of a hydroxy, halogen, alkoxy, amino, amido, nitro, nitrile, azo, acyl, carboxy, sulfoxy, sulfonyl, formyl, alkenyl, branched or unbranched alkyl, cycloalkyl, aminoalkyl, alkoxylalkyl, carboxylalkyl, arylalkyl, haloalkyl, azoalkyl, amidoalkyl, alkylcarbonyl, alkoxycarbonylalkyl, alkoxycarbonyl, aminocarbonyl, amidocarbonyl, arylcarboxamido, arylamino, arylcarbonyl, arylalkoxy, amidocarbonyl, carboxycarbonyl, cycloalkenyl and heterocyclyl moiety.

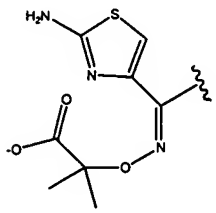
3. A β-lactamase inhibitor compound of Claim 2 wherein said R_1 substituent comprises a thiophene-2-yl moiety.

4. A β-lactamase inhibitor compound of Claim 1 wherein said R_2 substituent further comprises at least one of a carboxyl, formyl, sulfonyl, sulfoxy, heterocyclyl, cycloalkenyl, alkoxy, alkenyl, amino, amido, nitro, nitrile, azo, acyl, branched or unbranched alkyl, cycloalkyl, aminoalkyl, amidoalkyl, alkoxyalkyl and arylalkoxy moiety.

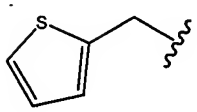
6. A β-lactamase inhibitor compound having a formula



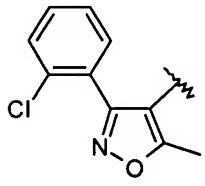
wherein R_1 is a substituent selected from (a) alkylaryl, (b) arylalkylether, (c) a moiety having the formula,



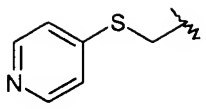
(d) a moiety having the formula,



(e) a moiety having the formula, and



(f) a moiety having the formula,



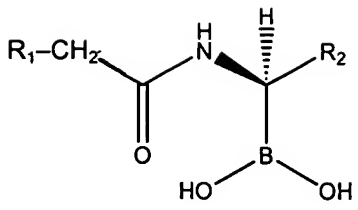
and wherein R_2 is a substituent selected from heterocyclyl, cycloalkenyl, alkenyl and alkyl moieties.

7. A β-lactamase inhibitor compound of Claim 6 wherein said R_1 substituent further comprises at least one of a hydroxy, halogen, alkoxy, amino, amido, nitro, nitrile, azo, acyl, carboxy, sulfoxy, sulfonyl, formyl, alkenyl, branched or unbranched alkyl, cycloalkyl, aminoalkyl, alkoxylalkyl, carboxylalkyl, arylalkyl, haloalkyl, azoalkyl, amidoalkyl, alkylcarbonyl, alkoxycarbonylalkyl, alkoxycarbonyl, aminocarbonyl, amidocarbonyl, arylcarboxamido, arylamino, arylcarbonyl, arylalkoxy, amidocarbonyl, carboxycarbonyl, cycloalkenyl and heterocyclyl moiety.

8. A β-lactamase inhibitor compound of Claim 6 wherein said R_2 substituent further comprises at least one of a hydroxy, halogen, alkoxy, amino, amido, nitro, nitrile, azo, acyl, carboxy, sulfoxy, sulfonyl, formyl, alkenyl, branched or unbranched alkyl, cycloalkyl, aminoalkyl, alkoxylalkyl, carboxylalkyl, arylalkyl, haloalkyl, azoalkyl, amidoalkyl, alkylcarbonyl, alkoxycarbonylalkyl, alkoxycarbonyl, aminocarbonyl, amidocarbonyl, arylcarboxamido, arylamino, arylcarbonyl, arylalkoxy, amidocarbonyl, carboxycarbonyl, cycloalkenyl and heterocyclyl moiety.

9. A β-lactamase inhibitor compound of Claim 8 wherein R_2 comprises phenyl substituted at the 3-position thereof.

10. A β-lactamase inhibitor compound having a formula

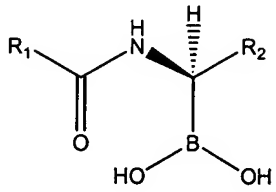


wherein R_1 is a substituent selected from hydrogen, alkyl, thiophenyl, pyrrolyl, furanyl, oxazolyl, imidazolyl and thiazolyl moieties; and wherein R_2 is phenyl.

11. A β-lactamase inhibitor compound of Claim 10 wherein said R_2 substituent further comprises at least one of a carboxy, formyl, sulfonyl and heterocyclyl moiety.

12. A β-lactamase inhibitor compound of Claim 11 wherein said R_2 substituent is substituted at the 3-position thereof.

13. A method of inhibiting a β-lactamase comprising contacting a β-lactamase with an effective amount of a compound having a formula



wherein R_1 is a substituent selected from hydrogen, alkyl, alkenyl, cycloalkenyl, and heterocyclyl moieties; and wherein R_2 is a substituent selected from heterocyclyl, cycloalkenyl, alkenyl and alkyl moieties.

14. The method of Claim 13 wherein said R_1 substituent further comprises at least one of a hydroxy, halogen, alkoxy, amino, amido, nitro, nitrile, azo, acyl, carboxy, sulfoxy, sulfonyl, formyl, alkenyl, branched or unbranched alkyl, cycloalkyl, aminoalkyl, alkoxylalkyl, carboxylalkyl, arylalkyl, haloalkyl, azoalkyl, amidoalkyl, alkylcarbonyl,

alkoxycarbonylalkyl, alkoxycarbonyl, aminocarbonyl, amidocarbonyl, arylcarboxamido, arylamino, arylcarbonyl, arylalkoxy, amidocarbonyl, carboxycarbonyl, cycloalkenyl and heterocyclyl moiety.

15. The method of Claim 14 wherein said R_1 substituent comprises a thiophene-2-yl moiety.

16. The method of Claim 13 wherein said R_2 substituent further comprises at least one of a carboxyl, formyl, sulfonyl, sulfoxy, heterocyclyl, cycloalkenyl, alkoxy, alkenyl, amino, amido, nitro, nitrile, azo, acyl, branched or unbranched alkyl, cycloalkyl, aminoalkyl, amidoalkyl, alkoxyalkyl and arylalkoxy moiety.

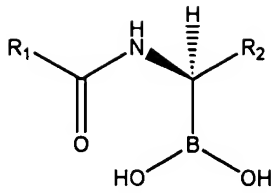
17. The method of Claim 13 wherein R_2 is a phenyl comprising one of a 3-carboxylate, a 3-formyl, a 3-sulfonate and a 3-heterocyclyl moiety.

18. The method of Claim 17 wherein R_1 comprises a thiophene-2-yl moiety; and wherein R_2 comprises phenyl with a 3-carboxylate moiety.

19. The method of Claim 13 wherein said compound comprises a pharmaceutically acceptable salt.

20. The method of Claim 13 wherein said contact is in vivo.

21. A method of treating a β-lactam antibiotic resistant bacterial infection comprising administering to a subject having a β-lactam antibiotic resistant bacterial infection, together with a β-lactam antibiotic, a therapeutically effective amount of a compound having a formula



including pharmaceutically acceptable salts and solvates thereof; wherein R_1 is a substituent selected from hydrogen, alkyl, alkenyl, cycloalkenyl, and heterocyclyl moieties; and wherein R_2 is a substituent selected from heterocyclyl, cycloalkenyl, alkenyl and alkyl moieties.

22. The method of Claim 21 wherein said R_1 substituent fruther comprises at least one of a hydroxy, halogen, alkoxy, amino, amido, nitro, nitrile, azo, acyl, carboxy, sulfoxy, sulfonyl, formyl, alkenyl, branched or unbranched alkyl, cycloalkyl, aminoalkyl, alkoxylalkyl, carboxylalkyl, arylalkyl, haloalkyl, azoalkyl, amidoalkyl, alkylcarbonyl, alkoxycarbonylalkyl, alkoxycarbonyl, aminocarbonyl, amidocarbonyl, arylcarboxamido, arylamino, arylcarbonyl, arylalkoxy, amidocarbonyl, carboxycarbonyl, cycloalkenyl and heterocyclyl moiety.

23. The method of Claim 22 wherein said R_1 substituent comprises a thiophene-2-yl moiety.

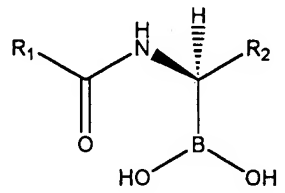
24. The method of Claim 21 wherein said R_2 substituent further comprises at least one of a carboxyl, formyl, sulfonyl, sulfoxy, heterocyclyl, cycloalkenyl, alkoxy, alkenyl, amino, amido, nitro, nitrile, azo, acyl, branched or unbranched alkyl, cycloalkyl, aminoalkyl, amidoalkyl, alkoxyalkyl and arylalkoxy moiety.

25. The method of Claim 24 wherein R_2 comprises phenyl and one of a 3-carboxylate, a 3-formyl, a 3-sulfonate and a 3-heterocyclyl moiety.

26. The method of Claim 21 wherein R_1 comprises a thiophene-2-yl moiety; and wherein R_2 comprises phenyl with a 3-carboxylate moiety.

27. The method of Claim 21 wherein said β-lactam antibiotic comprises at least one of a cephalosporin, a carbapenem, a monobactam, an aminocillin and a penicillin.

28. A pharmaceutical composition comprising a pharmaceutically-acceptable carrier and a compound having the formula



wherein R_1 is selected from hydrogen, alkyl, alkenyl, cycloalkenyl, and heterocyclyl moieties; and wherein R_2 is selected from heterocyclyl, cycloalkenyl, alkenyl and alkyl moieties.

29. The composition of Claim 28 wherein said R_1 substituent further comprises at least one of a hydroxy, halogen, alkoxy, amino, amido, nitro, nitrile, azo, acyl, carboxy, sulfoxy, sulfonyl, formyl, alkenyl, branched or unbranched alkyl, cycloalkyl, aminoalkyl, alkoxylalkyl, carboxylalkyl, arylalkyl, haloalkyl, azoalkyl, amidoalkyl, alkylcarbonyl, alkoxycarbonylalkyl, alkoxycarbonyl, aminocarbonyl, amidocarbonyl, arylcarboxamido, arylamino, arylcarbonyl, arylalkoxy, amidocarbonyl, carboxycarbonyl, cycloalkenyl and heterocyclyl moiety.

30. The composition of Claim 29 wherein said R_1 substituent comprises a thiophene-2-yl moiety.

31. The composition of Claim 28 wherein said R_2 substituent further comprises at least one of a carboxyl, formyl, sulfonyl, sulfoxy, heterocyclyl, cycloalkenyl, alkoxy, alkenyl, amino, amido, nitro, nitrile, azo, acyl, branched or unbranched alkyl, cycloalkyl, aminoalkyl, amidoalkyl, alkoxyalkyl and arylalkoxy moiety.

32. The composition of Claim 28 wherein R_2 comprises phenyl and one of a 3-carboxylate, a 3-formyl, a 3-sulfonate and a 3-heterocyclyl moiety.

33. A composition of Claim 28 wherein R_1 comprises a thiophene-2-yl moiety; and wherein R_2 comprises phenyl with a 3-carboxylate moiety.

34. A composition of Claim 28 wherein said composition comprises a β-lactam antibiotic.